

a correcting step of correcting degradation of optical characteristic of said projection system caused by setting said correction member at said predetermined position;

wherein said correcting step includes a first adjusting step of adjusting at least one of said reticle setting position and said substrate setting position.

2. (Amended) The method for manufacturing an exposure apparatus according to claim 1, wherein the first adjusting step does not correct all of the degradation of said optical characteristic, and wherein said correcting step further includes a second adjusting step of adjusting said projection system to correct the degradation of said optical characteristic that is not corrected by said first adjusting step.

3. (Twice Amended) The method for manufacturing an exposure apparatus according to claim 1, wherein said correcting step further includes a first calculating step, prior to said setting step, of calculating an adjusting amount of at least one of said reticle setting position and said substrate setting position in order to correct said degradation of optical characteristic produced in accordance with the thickness of said correction member; and

said first adjusting step includes a step of adjusting at least one of said reticle setting position and said substrate setting position based on a first calculated information obtained in said first calculating step.

4. (Amended) The method for manufacturing an exposure apparatus according to claim 1, and further comprising:

a support member arranging step, prior to said setting step, of arranging a support member supporting said correction member in order to set said correction member at said predetermined position.

6. (Amended) The method for manufacturing an exposure apparatus according to claim 1; wherein said first adjusting step includes a step of moving at least one of a reticle

stage that sets said reticle to said reticle setting position and a substrate stage that sets said photosensitive substrate to said substrate setting position.

7. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 1;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

8. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 3;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

9. (Amended) A method for manufacturing a micro device comprising:

Cont  
B2

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 4;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

10. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 5;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

11. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 6;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

12. (Amended) The method for manufacturing an exposure apparatus according to claim 2;

wherein said correcting step further includes a first calculating step, prior to said setting step, of calculating an adjusting amount of at least one of said reticle setting position and said substrate setting position in order to correct degradation of said optical characteristic produced in accordance with the thickness of said correction member, and

said first adjusting step includes a step of adjusting at least one of said reticle setting position and said substrate setting position based on first calculated information obtained in said first calculating step.

13. (Amended) The method for manufacturing an exposure apparatus according to claim 2;

wherein said correcting step further includes a second calculating step, prior to said setting step, of calculating an adjusting amount of said projection system so as to correct degradation of said optical characteristic unable to be corrected by said first adjusting step; and

said second adjusting step includes a step of adjusting said projection system based on second calculated information obtained in said second calculating step.

14. (Amended) The method for manufacturing an exposure apparatus according to claim 13; wherein said second adjusting step includes a step of adjusting at least one optical member of said projection system.

15. (Amended) The method for manufacturing an exposure apparatus according to claim 2; wherein said second adjusting step includes a step of adjusting at least one member of said projection optical system.

16. (Amended) A method for manufacturing a micro device comprising:  
a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 2;  
a reticle setting step of setting a reticle at said reticle setting position;  
a substrate setting step of setting a photosensitive substrate at said substrate setting position;  
an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and  
a developing step of developing said photosensitive substrate exposed by said exposing step.

17. (Amended) The method for manufacturing an exposure apparatus according to claim 12; wherein said correcting step further includes a second calculating step, prior to said setting step, of calculating an adjusting amount of said projection system so as to correct degradation of said optical characteristic unable to be corrected by said first adjusting step; and

said second adjusting step includes a step of adjusting said projection system based on second calculated information obtained in said second calculating step.

18. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 12;  
a reticle setting step of setting a reticle at said reticle setting position;  
a substrate setting step of setting a photosensitive substrate at said substrate setting position;  
an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

19. (Amended) The method for manufacturing an exposure apparatus according to claim 17; wherein said second adjusting step includes a step of adjusting at least one optical member of said projection system.

20. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 17;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

21. (Amended) The method for manufacturing an exposure apparatus according to claim 19, further comprising:

a support member arranging step, prior to said setting step, of arranging a support member supporting said correction member in order to set said correction member at said predetermined position.

22. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 19;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

24. (Amended) The method for manufacturing an exposure apparatus according to claim 23; wherein said first adjusting step further includes a step of moving at least one of a reticle stage that sets said reticle to said reticle setting position and a substrate stage that sets said photosensitive substrate to said substrate setting position.

25. (Twice Amended) A method for manufacturing an exposure apparatus comprising:

a providing step of providing a projection system that projects and exposes an image of a predetermined pattern formed on a reticle to a photosensitive substrate;

a measuring step of measuring residual aberration in said projection system;

a processing step of processing a correction member that corrects said residual aberration in said projection system based on measured information obtained in said measuring step;

an inserting step of inserting a correction member obtained in said processing step at a predetermined position in an optical path between a reticle setting position where said reticle is set and a substrate setting position where said photosensitive substrate is set; and

a first adjusting step of adjusting at least one of said reticle setting position and said substrate setting position in accordance with a change in an object-to-image distance of said projection system produced by inserting said correction member.

26. (Amended) The method for manufacturing an exposure apparatus according to claim 25, further comprising:

a second adjusting step of adjusting said projection system so as to correct degradation of optical characteristic of said projection system produced by inserting said correction member in said inserting step.

27. (Amended) The method for manufacturing an exposure apparatus according to claim 25, further comprising:

a first calculating step, prior to said measuring step, said processing step and said inserting step, of calculating an amount of change in an object-to-image distance of said projection system produced by inserting said correction member;

wherein said first adjusting step includes a step, prior to said measuring step, said processing step and said inserting step, of adjusting at least one of said reticle setting position and said substrate setting position based on first calculated information obtained in said first calculating step.



28. (Amended) The method for manufacturing an exposure apparatus according to claim 25, further comprising:

a first calculating step, independent from said measuring step, said processing step and said inserting step, of calculating an amount of change in an object-to-image distance of said projection system produced by inserting said correction member;

wherein said first adjusting step includes a step of adjusting at least one of said reticle setting position and said substrate setting position based on first calculated information obtained by said first calculating step.

29. (Amended) The method for manufacturing an exposure apparatus according to claim 25, further comprising:

a support member arranging step, prior to said measuring step, of arranging a support member supporting said correction member in order to set said correction member at said predetermined position.

30. (Amended) The method for manufacturing an exposure apparatus according to claim 25; wherein said first adjusting step includes a step of moving at least one of a reticle stage for setting said reticle to said reticle setting position and a substrate stage for setting said photosensitive substrate to said substrate arranging position.

31. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 25;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

32. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 27;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

33. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 28;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

34. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 29;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

35. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 30;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus predetermine in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

36. (Amended) The method for manufacturing an exposure apparatus according to claim 26, further comprising:

a first calculating step, prior to said measuring step, said processing step and said inserting step, of calculating an amount of change in an object-to-image distance of said projection system produced by inserting said correction member;

wherein said first adjusting step includes a step, prior to said measuring step, said processing step and said inserting step, of adjusting at least one of said reticle setting position and said substrate setting position based on first calculated information obtained in said first calculating step.

37. (Amended) The method for manufacturing an exposure apparatus according to claim 26, further comprising:

a second calculating step, prior to said measuring step, said processing step and said inserting step, of calculating an amount of adjustment for said projection system for correcting degradation of optical characteristic of said projection system produced by inserting said correction member;

wherein said second adjusting step includes a step, prior to said measuring step, said processing step and said inserting step, of adjusting said projection system based on second calculated information obtained in said second calculating step.

38. (Amended) The method for manufacturing an exposure apparatus according to claim 26, further comprising:

a first calculating step, independent from said measuring step, said processing step and said inserting step, of calculating an amount of change in an object-to-image distance of said projection system produced by inserting said correction member;

wherein said first adjusting step includes a step of adjusting at least one of said reticle setting position and said substrate setting position based on first calculated information obtained in said first calculating step.

39. (Amended) The method for manufacturing an exposure apparatus according to claim 38, further comprising:

a second calculating step, independent from said measuring step, said processing step and said inserting step, of calculating an amount of adjustment for said projection system so as to correct degradation of optical characteristic of said projection system produced by inserting said correction member;

wherein said second adjusting step includes a step of adjusting said projection system based on second calculated information obtained in said second calculating step.

40. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 39;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

41. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 26;

a reticle setting step of setting a reticle at said reticle setting position;  
a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

42. (Amended) The method for manufacturing an exposure apparatus according to claim 25, wherein said measuring step includes:

a step of measuring residual aberration in said projection system in a state in which an optical member exclusively for measurement having same optical thickness as said correction member is inserted into said predetermined position.

43. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 42;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

44. (Amended) The method for manufacturing an exposure apparatus according to claim 25, wherein said measuring step includes:

a step of measuring residual aberration of said projection system in a state in which an unprocessed correction member in said processing step is being inserted into said predetermined position.

45. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 44;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

46. (Amended) The method for manufacturing an exposure apparatus according to claim 36, further comprising:

a second calculating step, prior to said measuring step, said processing step and said inserting step, of calculating an amount of adjustment with respect to said projection system so as to correct degradation of optical characteristic of said projection system produced by inserting said correction member;

wherein said second adjusting step includes a step, prior to said measuring step, said processing step and said inserting step, of adjusting said projection system based on second calculated information obtained in said second calculating step.

47. (Amended) The method for manufacturing an exposure apparatus according to claim 46, wherein said measuring step includes:

a step of measuring residual aberration in said projection system in a state in which an optical member exclusively for measurement having same optical thickness as said correction member is inserted into said predetermined position.

48. (Amended) The method for manufacturing an exposure apparatus according to claim 46, wherein said measuring step includes:

a step of measuring residual aberration in said projection system in a state in which an unprocessed correction member in said processing step is being inserted into said predetermined position.

49. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 46;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

50. (Amended) A method for manufacturing an exposure apparatus comprising:

a measuring step of measuring optical performance of a projection system that projects and exposes an image of a predetermined pattern formed on a reticle to a photosensitive substrate;

Com  
B3



an improving step of improving the optical performance of said projection system based on measurement result by said measuring step; and

an adjusting step of adjusting an illumination characteristic by which said reticle is illuminated in accordance with said improving step.

51. (Amended) The method for manufacturing an exposure apparatus according to claim 50, wherein said improving step includes:

an arranging step of arranging a processed correction member based on measurement result in said measuring step in order to correct residual aberration in said projection system.

52. (Amended) The method for manufacturing an exposure apparatus according to claim 50, wherein said improving step includes:

a step of processing at least one optical member in said projection system based on measured result by said measuring step in order to correct residual aberration in said projection system.

53. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 50;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

54. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 51;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

55. (Amended) A method for manufacturing a micro device comprising:

a preparing step of preparing an exposure apparatus manufactured by using the method for manufacturing an exposure apparatus according to claim 52;

a reticle setting step of setting a reticle at said reticle setting position;

a substrate setting step of setting a photosensitive substrate at said substrate setting position;

an exposing step of exposing a pattern image of said reticle to said photosensitive substrate by using a projection system of an exposure apparatus prepared in said preparing step; and

a developing step of developing said photosensitive substrate exposed by said exposing step.

56. (Amended) A method for manufacturing an exposure apparatus, comprising:

Cont  
B3

a first providing step of providing a projection system that projects and exposes an image of a predetermined pattern formed on a reticle onto a photosensitive substrate;

a second providing step of providing a correction member that corrects residual aberration in said projection system;

Cond B3  
a setting step of setting said correction member at a predetermined position in an optical path between a reticle setting position where said reticle is set and a substrate setting position where said photosensitive substrate is set; and

a correcting step of correcting degradation of optical characteristic of said projection system caused by setting said correction member at said predetermined position;

wherein said correcting step includes a first adjusting step of adjusting at least one of said reticle setting position and said substrate setting position.

B4  
58. (Amended) A process for improving an optical characteristic of a projection system for projecting and exposing an image of a predetermined pattern formed on a reticle onto a photosensitive substrate, comprising:

a providing step of providing a correction member that corrects residual aberration in said projection system;

a setting step of setting said correction member at a predetermined position in an optical path between a reticle setting position where said reticle is set and a substrate setting position where said photosensitive substrate is set; and

a correcting step of correcting degradation of optical characteristic of said projection system caused by setting said correction member at said predetermined position;

wherein said correcting step includes a first adjusting step of adjusting at least one of said reticle setting position and said substrate setting position.

60. (Amended) A process for improving an optical characteristic of a projection system for projecting and exposing an image of a predetermined pattern formed on a reticle onto a photosensitive substrate, comprising:

a measuring step of measuring residual aberration in said projection system;

B5 a processing step of processing a correction member that corrects said residual aberration in said projection system based on measured information obtained in said measuring step;

an inserting step of inserting the correction member obtained in said processing step at a predetermined position in an optical path between a reticle setting position where said reticle is set and a substrate setting position where said photosensitive substrate is set; and

a first adjusting step of adjusting at least one of said reticle setting position and said substrate setting position in accordance with a change in an object-to-image distance of said projection system produced by inserting said correction member.

62. (Amended) A process for improving an optical characteristic of a projection system for an exposure apparatus, comprising:

B6 a measuring step of measuring the optical characteristic of the projection system that projects and exposes an image of a predetermined pattern formed on a reticle onto a photosensitive substrate;

an improving step of improving the optical characteristic of said projection system based on a measurement result obtained by said measuring step; and

an adjusting step of adjusting an illumination characteristic by which said reticle is illuminated in accordance with said improving step.